

# Middlesex University Research Repository

An open access repository of

Middlesex University research

<http://eprints.mdx.ac.uk>

Russell, Yvan I. ORCID logoORCID: <https://orcid.org/0000-0003-4608-4791>, Murzac, Adrian, Gobet, Fernand and Whitehouse, Harvey (2010) Semantic network analysis of religious pamphlets. In: Final EXREL Project Conference held in concert with Religion: A Human Phenomenon. XXth World Congress of the International Association of the History of Religions (IAHR), 15-21 Aug 2010, Toronto, Canada. . [Conference or Workshop Item]

Final accepted version (with author's formatting)

This version is available at: <https://eprints.mdx.ac.uk/18295/>

## Copyright:

Middlesex University Research Repository makes the University's research available electronically.

Copyright and moral rights to this work are retained by the author and/or other copyright owners unless otherwise stated. The work is supplied on the understanding that any use for commercial gain is strictly forbidden. A copy may be downloaded for personal, non-commercial, research or study without prior permission and without charge.

Works, including theses and research projects, may not be reproduced in any format or medium, or extensive quotations taken from them, or their content changed in any way, without first obtaining permission in writing from the copyright holder(s). They may not be sold or exploited commercially in any format or medium without the prior written permission of the copyright holder(s).

Full bibliographic details must be given when referring to, or quoting from full items including the author's name, the title of the work, publication details where relevant (place, publisher, date), pagination, and for theses or dissertations the awarding institution, the degree type awarded, and the date of the award.

If you believe that any material held in the repository infringes copyright law, please contact the Repository Team at Middlesex University via the following email address:

[eprints@mdx.ac.uk](mailto:eprints@mdx.ac.uk)

The item will be removed from the repository while any claim is being investigated.

See also repository copyright: re-use policy: <http://eprints.mdx.ac.uk/policies.html#copy>

# Semantic Network Analysis of Religious Pamphlets

## Introduction

- We introduce a new methodology for analyzing religious literature.
- *Semantic Network Analysis* (SNA) is a highly quantitative procedure where we distil the most commonly co-occurring words from large bodies of text.
- SNA is conducted using computer programs, where the text corpora are fed into an analyzer, and the output is a matrix of associations.
- Here, we provide an analysis of religious pamphlets (a.k.a. flyers, gospel tracts).

## Materials

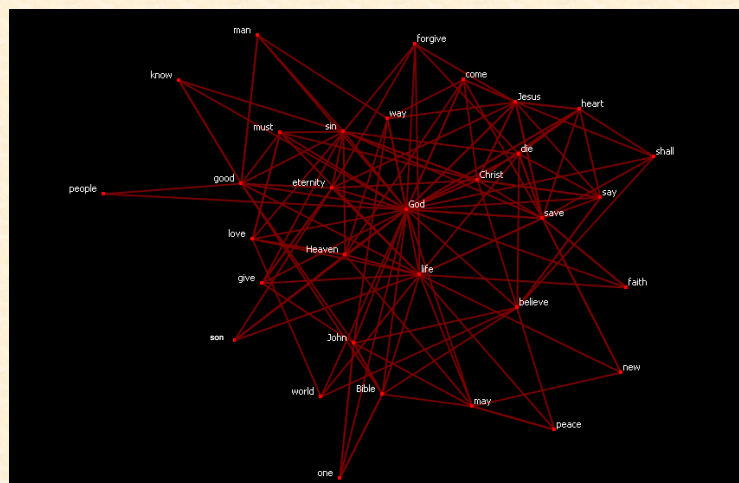
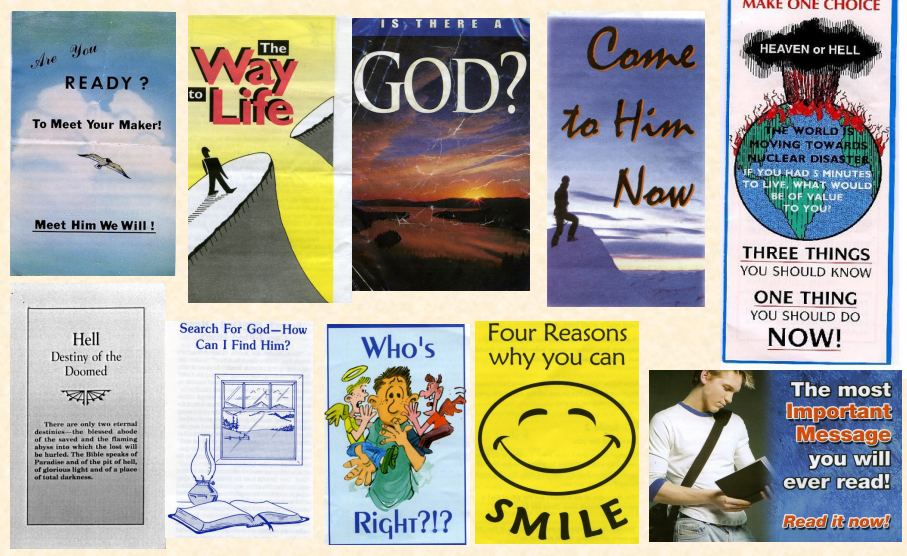
- The first author (Y.I.R.) collected 30 religious pamphlets over a period of approximately eighteen years (1992–2010) in Canada, the U.S.A., and the United Kingdom.
- All of these were collected in public, usually from people standing in the street who were there for the sole purpose of distributing them.
- These pamphlets were diverse in their format, their subject matter, their extent of professionalism, their publishers, and which church was distributing them.
- Most of the pamphlets did not show a publication date or the author's name.
- The mean word count of the entire collection was 916.5 (SD = 427.0), range 228 – 1936 words. The total word count was 27,495.
- There were 733 Biblical citations, with a mean of 24.5 citations per document (SD = 27.5), and 4.9 citations per page (SD = 6.4).

## Procedure

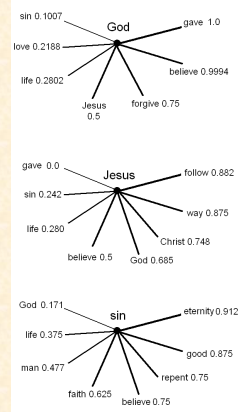
- We used the EXRELAN software (a variant of the ICAN program), which was created specifically for this project.
- EXRELAN works in the following steps:
  - 1) Corpus is prepared (contents of pamphlets were manually typed into a .doc file).
  - 2) Function words are removed from the documents (articles, pronouns, conjunctions, prepositions, etc.). This is done automatically by the program, but then further processing is done by hand to combine synonyms.
  - 3) Files are concatenated into a single corpus.
- Figure 1 shows how the text is transformed and then analyzed.
- A 'sliding window' is used, consisting of an odd number of words where the middle word is paired with each other word in the window.
- Co-occurrence established a score. This score decays with every non-occurrence.
- We chose a window of 11 words (5 + 1 + 5).

- Box 1 provides examples of the literature used.
- Religious pamphlets have been in existence since the Lutheran Reformation. Nowadays, they are used by various Evangelical Christian groups.
- Pamphlets are always provided free of charge in public, usually distributed to passerby on the street.
- Their aim is to persuade people of their message.
- In our study, we explore the semantic networks that are transmitted by these pamphlets.

**Box 1:** Sample of the religious pamphlets (10/30) used in this study.



**Figure 2.** Network diagram of most frequently occurring words (≥50 times), showing links with a score of 0.7 or more (scale 0 – 1.0).



**Figure 2.** Examples of linkages of three key words (God, Jesus, sin) to other words.

## Results

- Figure 2 is a network diagram showing the most frequent concepts and the links between them (drawn with the ORA program).
- As shown, certain words (e.g. God, life, Christ, etc.) were in the centre of the network, with many strong connections.
- Figure 3 provides examples of links to three key concepts: God, Jesus, and sin.
- Note that scores are asymmetrical: link from A → B is not necessarily the same as the link from B → A.

## Discussion

- We have provided a brief demonstration of the capabilities of SNA pertinent to the study of religion.
- This methodology can be applied to a wide variety of potential studies. For example:
  - Distillation of the major themes that emerge from various corpora (e.g. the Bible or the Qur'an could be compared, and the sections therein).
  - Analysis of historical trends in how concepts are transmitted (e.g. sermons through history).
- SNA can also be a useful adjunct to more traditional forms of the study of religion.

### Original text

...our sinful natures rebel at His ways. Part of us yearns for God and part of us reaches for fleshly desires. Our hearts are a battleground...

### Words removed and altered

sin nature rebel way part yearn God part reach flesh desire heart

### Sliding window

sin nature rebel way part yearn God part reach flesh desire heart

5 4 3 2 1 focal 1 2 3 4 5

sin nature rebel way part yearn God part reach flesh desire heart

5 4 3 2 1 focal 1 2 3 4 5

**Figure 1.** Text processing and sliding window.

Yvan I. Russell<sup>1-3 \*</sup>

Adrian Murzac<sup>1,4</sup>

Fernand Gobet<sup>2-3</sup>

& Harvey Whitehouse<sup>1</sup>

1. Explaining Religion Project, Institute of Social & Cultural Anthropology, University of Oxford, Oxford, UK
  2. Centre for the Study of Expertise, Dept. of Psychology, Brunel University, Uxbridge, UK
  3. Central and Eastern European Centre for Cognitive Science, New Bulgarian University, Sofia, Bulgaria
  4. New Bulgarian University
- Funded by a research grant from the European Commission

\* e-mail: yvanrussell@gmail.com